MODULE 6

INTRODUCTION TO DOSAGE CALCULATIONS

Introduction to Dosage Calculations module

OBJECTIVES:

1. Given a specified amount of a drug expressed in grams or milligrams and a drug solution with its concentration expressed as milligrams/milliliter, grams/milliliter, percentage strength, or ratio strength, calculate the volume of that solution required to supply the stated amount of the drug.

2. Given the recommended dosage of the drug expressed in milligrams per pound or milligrains per kilogram of body weight, the weight of the patient expressed in pounds or kilograms, and the concentration of the drug solution that is to be used, calculate the amount of drug and/or the volume of drug solution required to supply the recommended dosage of the drug.

In other modules you have learned to solve pharmaceutical calculations using ratio and proportion principles. You have also learned to solve problems using drug solutions whose strengths are expressed in percentage or ratio strength. Part one of this module reviews basic problem-solving procedures using percentage strength, ratio strength, and direct statement drug solutions.

Answer the following 5 questions as a self-assessment tool. The answers are located immediately following these questions.

1. A patient is to receive 150 milligrams of a particular drug. The drug is supplied in the following concentration: 25 mg/ml. How many milliliters of the drug solution are required to provide the dose of 150 mg?

ANSWER: _____milliliters

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2. A patient is to be administered 540 milligrams of a particular drug. The drug is supplied as a 1% solution. Calculate the volume of the 1% solution required to supply the 540 milligrams of the drug.

ANSWER: _____milliliters

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3. You wish to administer 5 milligrains of a medication. On hand you have a 10 milliliter ampule of the drug solution labeled 1:1000. State the volume of the 1:1000 solution required to administer the 5 milligrains of the drug.

ANSWER: _____milliliters

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4. A patient is to receive a dose of 80 milligrams of a drug. The drug is supplied in the following concentration: 20 mg/ml. State the volume of drug solution required to supply the 80 mg of the drug.

ANSWER:_____milliliters

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5. A patient is to receive 0.1 mg of epinephrine. The epinephrine comes supplied in a 1:100,000 solution. Calculate the volume of the solution required to provide the 0.1 mg of epinephrine.

ANSWER:_____ milliliters

ANSWERS FOR FIVE (5):
PREASSESSMENT QUESTIONS

1. 6 milliliters
2. 54 milliliters
3. 5 milliliters
4. 4 milliliters
5. 10 milliliters

*****DIRECTIONS FOR ABOVE PREASSESSMENT SCORE*****

A. All problems correctly solved--proceed to page 6-4.

B. If you missed one or more of the above five problem(s), proceed as indicated below by the number of the problem(s) missed.

Problem 1: Review Ratio and Proportion Module 1-0, then return to page 6-4.

Problem 2: Review Solution Module 4-0, then return to page 6-4.

Problem 3: Review Solution Module 4-0, then return to page 6-4.

Problem 4: Review Ratio and Proportion Module 1-0, then return to page 6-4.

Problem 5: Review Solution Module 4-0, then return to page 6-4.

Solve the following:

1. A continuous infusion of vecuronium bromide (1mcg/kg /min) may be initiated 30 minutes after an intubating dose of vecuronium, (90mcg/kg). Assuming the patient weighs 150 pounds, what would the total dose of vecuronium bromide (in mg) be after a case lasting 90 minutes, with the infusion running for 1 hour?

ANSWER #1

Step 1. Convert the patients in pounds to kilograms.

2.2lb = 1kg

To convert the patients weight divide 150 pounds by 2.2.

150lb divided by 2.2 = 68.18kg = 68kg

Step 2. Now that you have the patients weight in kg, determine the dosage per minute.

68kg x 1mcg = 68mcg/min

The patient recieved 90mcg/kg on induction,

90 x 68kg = 6120mcg

The infusion ran for 1 hour = 60 minutes

60 min x 68mcg = 4080mcg

Answer: Total dose of vecuronium = 6120mcg + 4080mcg = 10,200mcg or 10.2mg

2. You, as a CRNA have a hypertensive patient in the neuro-intensive care unit with a head injury being prepped for surgery to have a hematoma evacuated. Prior to transfer, the patients neurosurgeon wants you to start 3mcg/kg/min of Nipride to obtain a MAP of 60 mmHg. The available solution: 50 mg of Nipride in 250 ml D5W. Pt weight: 60 kg. Calculate the flow rate in ml/hr that will deliver this dosage.

ANSWER #2.

Step 1. Determine the dosage per minute

60kg x 3mcg/kg = 180ug/min

Step 2: Convert to dosage per hour

180mcg/min x 60 = 10800mcg/hr

Step 3: Convert to like units

10,800mcg = 10.8mg

Calculate flow rate in ml/hr

50mg : 250ml = 10.8mg : x ml

$50x = 250 \times 10.8$

$\frac{50x}{50} = \frac{2700}{50}$

Answer: x = 54ml/hr

3. You are preparing to induce your patient for a radical prostatectomy. Plan is to induce with Sufenta and start a Sufenta infusion to decrease your inhalation agent requirement. Patient weight: 70kg. Induction dose of Sufenta is 8mcg/kg. You want to infuse 3mcg/kg/hr approximately 45 minutes after induction. Available concentration of Sufenta is 10mcg/ml (25ml of Sufenta in 100ml diluent). How many ml/hr will you need to run the infusion to 3mcg/kg/hr?

.ANSWER #3

Step1. Determine the dosage per hour

70kg x 3mcg = 210mcg/hr

Step 2. Calculate the flow rate in ml/hr

10ug : 1ml = 210ug : x ml

10x = 210 X 1ml

$\frac{10x}{10} = \frac{21mcug/ml}{10}$

Answer: x = 21ml/hr will administer 3mcg/kg/hr.

4. Your patient is coming to the OR with a perforated viscous. The patient is very hypotensive and is not responding to the ephedrine you have given him. The anesthesiologist on call with you asks you to mix an epinephrine infusion just in case you need it. Assuming you had to run the epinephrine at 30 ml/hr, calculate the mg/hr, mcg/hr, and mcg/min. Solution available is 2mg in 250 ml D5W.

ANSWER #4

Step 1. 2mg : 250ml = x mg : 30ml

Step 2: $\frac{250\ x}{250} = \frac{60}{250}$

Answer: x = 0.24mg/hr

Note: Convert mg to ug (1000 = 1mg)
0.24 = 240mcg/hr

Convert ug/hr to mcg/min
$\frac{240mcg/hr}{60\ min} = 4mcg/min$